

Entry of Amendment

Entry of this Amendment is proper under 37 C.F.R. §1.116 since the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not raise any new issue requiring further search and/or consideration as the amendments are for clarity and cosmetic purposes; (c) satisfy a requirement of form asserted in the previous Office Action; (d) do not present any additional claims without canceling a corresponding number of finally rejected claims; and (e) place the application in better form for appeal, should an appeal be necessary. The Amendment is necessary and was not earlier presented because it is made in response to arguments raised in the Final Rejection. Entry of the Amendment is thus respectfully requested.

New Matter

The Response filed September 24, 2002, is objected to under 35 U.S.C. 132 for introducing new matter into the disclosure. Accordingly, the Office Action requires the new matter be canceled. The Office Action states the material added to the paragraph bridging pages 7 and 8 not supported by the original disclosure is the statement that the "contact ratio defines the ratio of the radius of curvature R of the roller guide surface relative to the radius of curvature r of the roller outer peripheral surface." The Office Action also notes similar language was added to claim 1.

Applicants respectfully traverse the objection.

Applicants respectfully submit that one of ordinary skill in the art would know what the term contact ratio defines given the context of the invention and as such, there is no point in going to great length or detail defining such a well known term in the art.

Applicants acknowledge that the originally filed application does not provide any explicit support for such a definition of the term in question, i.e., "contact ratio." However, enclosed herein are copies of published Japanese Patent Application Numbers 8-128454 (hereinafter "JP '454"); 2000-55068 (hereinafter "JP '068"); and 2000-240673 (hereinafter "JP '673") wherein the term contact ratio or essentially similar concept are discussed.

In particular, column 7, lines 26-28 of JP '454 states ". . . curvature ratio is determined by $v=r_1/r_2$ where r_1 and r_2 stand for ball radius and groove radius, respectively." While Applicants acknowledge the terms curvature ratio and contact ratio are not identical, they both address the degree of contact between two circles of spherical surfaces. Furthermore, Applicants respectfully note that this applies to Iwasaki and Bartlett.

Specifically, the ratio of the diameter of the roller guide surface 13 to that of the spherical roller 21, as set forth in column 4, lines 4-6 of Iwasaki, corresponds, in substance, to the contact ratio, as in the instant application. Additionally, the relationship between R-meridian and R-track known as the conformity therebetween as set forth in column 3, lines 59-60 of Bartlett corresponds, in substance, to the contact ratio as in the instant application.

Also, column 11, lines 11-15 of JP '068 teaches that "contact ratio" is defined as a ratio of cross-sectional length of control track grooves 26 and 34 to the length of the contact area between the groove and the controller 50. Thus, the contact ratio 1 means a state in which the cross-section of the control track groove 26 and 34 entirely comes into contact with the end face of the controller. See Figure 6.

Additionally, column 4, line 20 of JP '673 states that "α: contact ratio" and Fig. 4(b) shows that ball 3 has a radius R and groove 2b has a radius $2\alpha R$.

In view of the above-discussed related art, Applicants respectfully submit that one of ordinary skill in the art would know what the term contact ratio defines given the context of the invention and as such, there was no point in going to great length or detail defining a term well known in the art.

As such, Applicants respectfully submit that the Response dated September 24, 2002 does not introduce new matter but merely provides an explanation of a concept and term that is well known in the art.

Drawings

The drawings are objected to because none of Figures 1-4 include reference character "r," which defines a critical dimension in the calculation of the "contact ratio." Enclosed herein is a Request for Approval of Drawing Corrections, along with drawing Figure 1, which is amended responsive to the objection.

Applicants respectfully request withdrawal of the objection.

The Office Action requires that drawing Figures 5A and 5B include reference characters 14' and 30' as the reference numerals identify elements critical to understanding the dimensions defined by reference characters R and r, respectively. Enclosed herein is a Request for Approval of Drawing Corrections, along with drawing Figures 5A and 5B, which are amended responsive to the objection.

Applicants respectfully request withdrawal of the objection.

Specification

The disclosure is objected to because reference character "r" should follow "curvature" on page 21, line 10, so as to properly identify the radius of curvature of the outer surface roller 30. Applicants have amended the Specification responsive to the objection.

Applicants respectfully request withdrawal of the objection.

The Specification is objected to as failing to comply with 37 C.F.R. 1.71 and 1.75(d)(1) because the detailed description fails to provide proper antecedent basis for the claimed subject matter. Applicants respectfully traverse the objection as it erroneously states the requirements of the relevant rules.

In particular, the Office Action indicates antecedent basis for the feature "a contact ellipse . . . does not deviate from the end surface of said roller" recited by claim 1, lines 12-14 and the feature "the contact surface pressure produced on said roller" recited by claim 2, line 3, is not provided in the detailed description portion of the originally filed application. The Response dated September 24, 2002 argued the objections should be withdrawn as the above-objected to features are mentioned in the Summary of the Invention.

The Office Action takes the position that the features recited by the claims must are required to be described in the detailed description portion of the application. The Office Action cites 37 C.F.R. 1.71, 1.73, and 1.75(d)(1) for support of his position.

Applicants respectfully, but forcefully, disagree with the position taken by the Office Action for the following reasons.

37 C.F.R. 1.71(a) states “[t]he specification must include a written description of the invention . . .” Furthermore, Applicants respectfully note that 37 C.F.R. 1.73(d)(1) states “[t]he claims or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.” The “remainder of the specification” refers to the portion of the originally filed application that is not the claims, i.e., Background of the Invention, Summary of the Invention, Detailed Description of the Invention, and any drawings of the invention that were filed with the application.

Nowhere does 37 C.F.R. 1.71, 1.73, or 1.75 require that support or antecedent basis for claimed subject matter be provided in a particular portion of the originally filed application. Rather, support or antecedent basis for claimed subject matter may be provided anywhere within the originally filed application. Accordingly, unless relevant case law, comments during the federal rule making period or other such evidence can be provided substantiating the position taken by the Office Action, Applicants respectfully submit the Office Action is attempting to impose a standard that is not required by any relevant patent rule or law and is contrary to well established principles and guidelines of the U.S. Patent System.

Withdrawal of the objection is respectfully requested.

Claim Objections

Claim 1 is objected to for an informality. The claim is amended herein responsive to the objection.

Applicants respectfully request withdrawal of the objection.

Claim Rejections - 35 U.S.C. § 112

Claims 1-7 are rejected under 35 U.S.C. § 112, first paragraph. Applicants respectfully traverse the rejection.

The Office Action states the Specification does not appear to provide a written description of the "contact ratio defines the ratio of the radius of curvature R of the roller guide surface relative to the radius of curvature r of the roller outer peripheral surface."

Applicants respectfully submit that one of ordinary skill in the art would know what the term contact ratio defines given the context of the invention for the reasons discussed above under the "New Matter" heading, which are equally applicable herein.

Withdrawal of the rejection is respectfully requested for the same reasons as the objection is requested to be withdrawn.

Claim Rejections - 35 U.S.C. § 102

Claims 1-3, and 6-7 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent Number 6,033,311 to Barlett. Applicants respectfully traverse the rejection.

Pending claim 1 recites a tripod constant velocity universal joint, including an outer joint member having three axial track grooves in an inner periphery and roller guide surfaces formed in opposing side walls of each track groove; a tripod member having three radially projecting trunnion journals; and rollers that rotate around respective trunnion journals through a plurality of needle rollers and received in the track grooves of the outer joint member. Each roller is guided on a part-spherical outer peripheral surface by the roller guide surfaces. Contact between the roller and the roller guide surfaces is circular contact having a contact ratio 1.01 or above. A width

dimension of the roller is reduced to an extent that a contact ellipse produced by the roller during application of a predetermined torque does not deviate from an end surface of the roller. The contact ratio is defined by a ratio of a radius of curvature of the roller guide surface relative to a radius of curvature of the outer peripheral surface.

As stated above, pending claim 1 recites the outer peripheral surface of the roller is part-spherical. Furthermore, Applicants note the first full paragraph on page 21 of the instant application explains that the outer peripheral surface of the roller is part-spherical.

Barlett discloses a constant velocity ratio universal joint of the tripod type having an external circumferential surface 41 of a roller 29 that is barrel-shaped not part-spherical. See column 3, lines 50-53. In fact, Barlett states in column 1, lines 21-60 that rollers with part-spherical external circumferential surfaces suffer from the problem of "shudder."

To qualify as prior art under 35 U.S.C. §102, a single reference must teach, i.e., identically describe, each feature of a rejected claim. As explained above, Bartlett does not disclose or suggest rollers having part-spherical peripheral surfaces. As such, Applicants respectfully submit Bartlett does not anticipate or render obvious the invention recited by claim 1.

Furthermore, in view of the clear and unambiguous statements of Bartlett cited above, Applicants respectfully submit that Barlett specifically teaches away from using tripod type constant velocity universal joints with rollers having part-spherical peripheral surfaces.

As such, Applicants respectfully submit that claim 1 be deemed allowable.

Claims 2-3 and 6-7 depend from claim 1. It is respectfully submitted that these dependent claims be deemed allowable for at least the same reasons as claim 1, as well as for the additional subject matter recited therein.

Withdrawal of the rejection is respectfully requested.

Claim Rejections - 35 U.S.C. § 102 & 103

Claims 1, 4, and 6-7 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent Number 4,773,890 to Iwasaki et al. (hereinafter "Iwasaki"). Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Iwasaki. Applicants respectfully traverse both rejections.

Pending claim 1 recites a tripod constant velocity universal joint, including an outer joint member having three axial track grooves in an inner periphery and roller guide surfaces formed in opposing side walls of each track groove; a tripod member having three radially projecting trunnion journals; and rollers that rotate around respective trunnion journals through a plurality of needle rollers and received in the track grooves of the outer joint member. Each roller is guided on a part-spherical outer peripheral surface by the roller guide surfaces. Contact between the roller and the roller guide surfaces is circular contact having a contact ratio 1.01 or above. A width dimension of the roller is reduced to an extent that a contact ellipse produced by the roller during application of a predetermined torque does not deviate from an end surface of the roller. The contact ratio is defined by a ratio of a radius of curvature of the roller guide surface relative to a radius of curvature of the outer peripheral surface.

The Office Action states Figure 3 of Iwasaki shows that the form of contact between the roller 21 and the roller guide surface 13 is arc-to-arc contact and that the "contact ratio" is 1.01 or above.

Applicants respectfully submit that Iwasaki discloses the roller guide surfaces are in contact with the spherical roller at two points and not arc to arc as alleged by the Office Action, whereas pending claim 1 recites contact between the roller and the roller guide surfaces is circular contact.

To qualify as prior art under 35 U.S.C. §102, a single reference must teach, i.e., identically describe, each feature of a rejected claim. As explained above, Iwasaki does not disclose or suggest circular contact as Iwasaki teaches contact occurring at two points. As such, Applicants respectfully submit Iwasaki does not anticipate or render obvious the invention recited by claim 1.

Claims 4-7 depend from claim 1. It is respectfully submitted that these dependent claims be deemed allowable for at least the same reasons as claim 1, as well as for the additional subject matter recited therein.

Withdrawal of the rejection is respectfully requested.

Conclusion

In view of the foregoing, reconsideration of the application, withdrawal of the outstanding rejections, allowance of claims 1-7, and the prompt issuance of a Notice of Allowability are respectfully solicited.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing docket number 100725-00040.**

Respectfully submitted,
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Enclosures: Request for Approval of Drawing Corrections
Amended drawing Figures 1, 5A, and 5B
Marked Up Version of Specification as Amended
Marked Up Version of Claim 1 as Amended
JP 8-128454
JP 2000-55068
JP 2000-240673

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S. Patent Application Serial Number 09/853,038
Attorney Docket Number 100725-00040

Marked Up Version of Specification as Amended

IN THE SPECIFICATION:

Please amend the first full paragraph on page 21 of the Specification as follows:

The outer peripheral surface of the roller 30 is part of a spherical surface, i.e., a partial spherical surface, and has a center of curvature at a portion radially spaced away from the axis and its curvature r is slightly smaller than that of the roller guide surfaces 14 (see Fig. 1). Further, the form of contact between the roller 30 and the roller guide surfaces 14 is arc-to-arc contact as seen in a cross section, i.e., circular contact.



U.S. Patent Application Serial Number 09/853,038
Attorney Docket Number 100725-00040

Marketed Version of Claim 1 as Amended

IN THE CLAIMS:

Please amend claim 1 as follows:

1. (Amended Twice) A tripod constant velocity universal joint comprising:
an outer joint member having three axial track grooves in an inner periphery and
roller guide surfaces formed in opposing side walls of each track groove;
a tripod member having three radially projecting trunnion journals; and
rollers that rotate around respective trunnion journals through a plurality of
needle rollers and received in the track grooves of said outer joint member, each roller
being guided on [an] a part-spherical outer peripheral surface by said roller guide
surfaces,

wherein contact between said roller and said roller guide surfaces is circular
contact having a contact ratio 1.01 or above, wherein a width dimension of said roller is
reduced to an extent that a contact ellipse produced by said roller during application of a
predetermined torque does not deviate from an end surface of said roller, and

wherein said contact ratio is defined by a [ration] ratio of a radius of curvature of
said roller guide surface relative to a radius of curvature of said outer peripheral surface.